

REMARKS

The Applicants appreciate the thoroughness with which the subject application has been examined. By this Amendment certain claims as indicated above have been amended to overcome the Examiner's rejections and objections and more concisely describe and claim the present invention. Claims 1-32 remain in the application for reconsideration by the Examiner. Claims 33-35 have been withdrawn. The Examiner's allowance of all pending claims is earnestly solicited.

MATTERS RELATED TO THE ELECTION/RESTRICTION REQUIREMENT

The Applicants acknowledge the withdrawal of claims 33-35. The Examiner has stated that claims 33-35 must be cancelled in the Applicants' response to the present Office Action. This requirement conflicts with MPEP Section 821.01 wherein it is stated that a complete reply to a final Office Action must include cancellation of the claims drawn to the non-elected invention. Since the instant Office Action is not a final Office Action this requirement to cancel the withdrawn claims is deemed premature.

MATTERS RELATED TO THE DRAWINGS

In response to the Examiner's comments regarding Figures 1 and 4, the Applicants submit draft replacement pages for these Figures as Attachment 1.

MATTERS RELATED TO THE CLAIMS

Claims 7 and 8 stand rejected under Section 112, second paragraph. The Examiner notes an inconsistency between claim 6 and claims 7/8 regarding the third and fourth doped regions. The Applicants have revised claim 7 as indicated above to resolve this inconsistency.

Within the first claim set comprising claims 1-16, claims 1-13 stand rejected under Section 102(b) as anticipated by Miyagi (6,330,204), claims 3, 4, 6, 8, 9, 12 and 13 stand rejected under Section 103(a) as unpatentable over Miyagi in view of Shah (6,472,686). Claims 14, 15 and 16 have been objected to but would be allowable if re-written in independent form, including all of the limitations of the base claim and any intervening claims.

To further define the invention over the cited art, the Applicants have amended claim 1 as set forth above in the marked-up version of the claim. In particular, the Applicants have

amended the second paragraph to read, “an element for switching on the bulk semiconductor device by applying an external voltage across two adjacent doped regions of the plurality of doped regions to forward bias a pn junction formed by the two adjacent doped regions.” The Applicants have further amended the first paragraph to, “a controllable bulk semiconductor device comprising a plurality of alternating p-type and n-type doped regions and coupled for selective current injection into the fuse.”

Miyagi discloses, “the use of a thyristor 11 having an anode terminal connected to an internal power source through the fuse 10, and a cathode terminal being ground.” Miyagi further discloses a MOS transistor 12 that is on/off controlled by a disconnect signal SW. To store a data “0”, Miyagi discloses that, “a disconnect signal SW is inputted from the not-shown control circuit to the gate terminal of the n-channel MOS transistor 12. This turns on the n-channel MOS transistor 12 to thereby trigger the gate of the thyristor 11.” See Miyagi’s column 6 beginning at line 17.

Miyagi does not disclose, “an element for switching on the bulk semiconductor device by applying an external voltage across two adjacent doped regions of the plurality of doped regions to forward bias a pn junction formed by the two adjacent doped regions.”

There is also no suggestion, motivation or inference in Miyagi that relates directly or indirectly to “an element for switching on the bulk semiconductor device by applying an external voltage across two adjacent doped regions of the plurality of doped regions to forward bias a pn junction formed by the two adjacent doped regions,” as claimed by the Applicants in amended claim 1.

It is respectfully submitted that each of the dependent claims 2-13 depending from amended independent claim 1 includes one or more elements that further distinguish the invention over the art of record. These claims should therefore be in condition for allowance. It is noted that dependent claims 3, 5, 9, 11, 12 and 13 have been amended for consistency with the revisions to claim 1 from which they depend.

Further to the rejection of dependent claims 3, 4, 6, 8, 9, 12 and 13 over Miyagi in view of Shah, there is no suggestion in either reference disclosing how the references can be combined in the manner proposed by the Examiner. Absent such a suggestion, there is no reason why one skilled in the art faced with the same problem confronting the Applicants and without prior knowledge of the Applicants’ claimed invention, would consult the particular combination of

references suggested by the Examiner. In this connection, there is no disclosure in Shah of use of a thyristor for opening an integrated circuit fuse, instead Shah discloses an SiC gate turnoff thyristor. Without a recognition of or relevance to such problem, one skilled in the art would not be likely to use the Shah reference in combination with Miyagi to attempt to solve the problem faced by the Applicants.

As to objected claims 14, 15 and 16, the Applicants have adopted the Examiner's suggestion and re-written dependent claim 14 in independent form as set forth above. Claims 15 and 16 depend from amended claim 14 and therefore it is believed that the objection to these claims has also been overcome.

With respect to the second claim set comprising independent claim 17 and dependent claims 18-28, claims 17-23 and 26-28 stand rejected under Section 102(b) as anticipated by Miyagi. Claims 18-23 and 26 stand rejected under Section 103(a) as unpatentable over Miyagi in view of Shah.

Claim 17 has been amended as indicated above. In particular, claim 17 now includes "an element for switching the thyristor to an on state by controlling a voltage applied across two adjacent doped regions of the plurality of doped regions to forward bias a pn junction formed by the two adjacent doped regions, wherein while in the on state the thyristor is responsive to the current flow such that current flows through the fuse, and wherein the fuse opens in response to the current. As discussed above in conjunction with the rejection of claim 1, Miyagi does not disclose this element and thus claim 17 is patentable thereover.

There is also no suggestion, motivation, disclosure or inference in Miyagi that directly or indirectly relates to "an element for switching the thyristor to an on state by controlling a voltage applied across two adjacent doped regions of the plurality of doped regions to forward bias a pn junction formed by the two adjacent doped regions, wherein while in the on state the thyristor is responsive to the current flow such that current flows through the fuse, and wherein the fuse opens in response to the current."

Dependent claims 18-23 depending from amended independent claim 17 each includes one or more elements that further distinguish the invention over the art of record. These claims should therefore be in condition for allowance. Claims 21, 22, 23 have been amended to correct the dependency.

It is noted that the dependency of claim 26 has been amended to now depend from claim 24. Thus claims 26-28 now depend from claim 24 and will be discussed below in conjunction with the discussion of independent claim 24.

To overcome the Examiner's objection to claims 24 and 25, the Applicants have re-written claim 24 in independent form. Claim 25 depends from claim 24 and thus the objection to claim 25 should be overcome. Further, since claims 26-28 also now depend from claim 24 they should be in condition for allowance.

Independent claim 29 is rejected under Section 103(a) as unpatentable over Hurst (6,646,912) in view of Miyagi.

Claim 29 has been revised as indicated above, in particular, the Applicants have added a paragraph referring to "a gating device" and claim that the controllable bulk semiconductor device compris[es] a plurality of doped regions. The last paragraph has been amended to "wherein current flows into the fuse in response to an on state of the bulk semiconductor device for opening the fuse, wherein the gating device controls the bulk semiconductor device to the on state by controlling a voltage applied to two adjacent doped regions of a plurality of doped regions, and wherein the voltage biases a pn junction formed by the two adjacent doped regions." Support for the gating device is found in the specification in paragraphs [0028] and [0029].

Hurst discloses a non-volatile memory array comprising, "a fuse element 64 coupled in series with a diode element 66." Hurst does not disclose use of a controllable bulk semiconductor device for opening the fuses. Thus, it cannot be seen how Hurst and Miyagi can be combined since there is no disclosure or motivation in either reference for making the combination nor any disclosure as to how the combination can be made workable. It is suggested therefore that the amendments to claim 29 overcome the rejection under Section 103(a).

Independent claim 30 and dependent claims 31 and 32 stand rejected under Section 102(b) as anticipated by Miyagi.

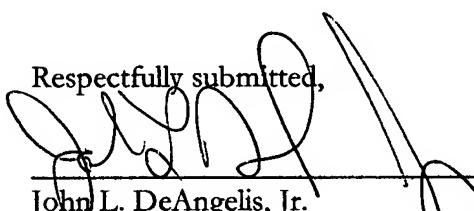
Claim 30 has been amended to include "forward biasing a pn junction of the plurality of semiconductor pn junctions by applying an external voltage across the pn junction to allow current to flow through the bulk semiconductor device to the fuse for opening the fuse." As described above, Miyagi does not disclose at least this element of amended claim 30. Neither does Miyagi suggest or infer such an element.

Dependent claims 31 and 32 depending from amended independent claim 30 each includes one or more elements that further distinguish the invention over the art of record. These claims should therefore be in condition for allowance.

The Applicants have attempted to comply with all of the points raised in the Office Action and it is believed that the remaining claims in the application, i.e., 1-32, are now in condition for allowance. In view of the foregoing amendments and discussion, it is requested that the Examiner's claim rejections have been overcome. It is respectfully requested that the Examiner reconsider these rejections and objections and issue a Notice of Allowance for all claims pending in the application.

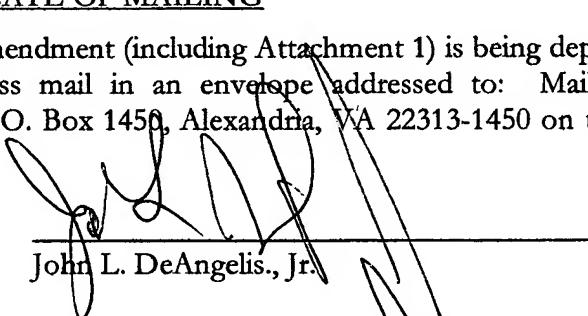
The Applicants hereby petition for an extension of time of one month under the provisions of 37 C.F.R. 1.136. A check in the amount of \$120 payable to the Director of USPTO is enclosed in payment of the extension fee.

If a telephone conference will assist in clarifying or expediting this Amendment or the claim changes made herein, the Examiner is invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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CERTIFICATE OF MAILING

I HEREBY CERTIFY that this Amendment (including Attachment 1) is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 4th day of August, 2005.





ATTACHMENT 1

REPLACEMENT SHEETS FOR FIGURES 1 AND 4